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AN ELECYROMECHANICAL PULSE SOURCE

by

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

AN ELECTROMECHANICAL PULSE SOURCE

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There is a known electromechanical pulse source which contains a self-excited asynchronous generator with commutation apparatus.

In this proposed invention, in order to increase the frequency of pulse succession, the winding of the rotor of the generator is comprised of two mutually-perpendicular parts, one of which is short-circuited, while the other is closed across a commutation apparatus which is opened after the current pulse in the load until the emf is restored.

Figure 1 shows the schematic of the electromechanical pulse source, while fig. 2 shows the curves for the emf of the generator (1) and the load current ($i_н$).

The schematic of the pulse source contains commutators 1--3, a short-circuited winding of the rotor 4, a stator winding 5, and a rotor winding 6. In the starting condition the commutators 1--3 are open and the rotor of the generator is caused to turn at a constant speed ω. As the machine is not under excitation, there are no losses of an electromagnetic nature, but only mechanical

losses. The kinetic energy accumulated by the rotor may be retained as long as desired, in view of the insignificant mechanical losses.

For excitation, the commutator 1 (t_1 in fig. 2) is closed. Whereas in asynchronous machines with symmetrical rotor the process of self-excitation is measured in seconds or dozens of seconds, in this particular case the process of self-excitation occurs in several periods of the emf of the generator. This is physically explained by the fact that there is a uniaxial short-circuited winding 4 on the rotor and, consequently, at those moments of time when the axes of the stator winding 5 and the rotor winding 4 are mutually perpendicular, there is nothing to prevent the stator flux from penetrating the rotor. As a result, the flux in the machine rises very quickly and the self-excitation is finished after two-four periods of the emf of the generator. After the self-excitation, the commutator 3 is closed and thus a symmetrical system of windings is formed on the rotor, which is characteristic for asynchronous impact-type generators. After this, the machine is ready for operation.

At the moment when the emf of the generator passes through zero (t_2 in fig. 2), the load is included by the closure of commutator 2. At the moment when the load current $i_н$ passes through zero (t_3 in fig. 2), the commutator 2 is opened and then, at the next passage of the current through zero in the rotor winding 6, the commutator 3 is opened. A uniaxial short-circuited contour is formed on the rotor by winding 4. During the current pulse there is a significant reduction in the emf as a result of the armature reaction, while after the disconnection of the load there is an

increase in the emf. The emf is restored at great speed since, as for the original self-excitation, there is nothing to prevent the stator flux from penetrating the rotor. The restoration of the emf to the value preceding the current pulse occurs in two-four emf periods. After the restoration of the emf, the commutator 3 is closed and the generator is again ready for hooking up the load. At the moment when the emf of the generator passes through zero (t_4 in fig. 2), the load is once again included by the closing of commutator 2. After this, the processes repeat themselves. Thus, the device can provide a frequency of pulse succession which is determined by the duration of several emf periods. This, in its turn, assures a concentration of larger powers in the load and, consequently, enlarges the capabilities of asynchronous impact generators as storages and sources of large pulsating powers.

The Subject of the Invention

An electromechanical pulse source, containing a self-excited asynchronous generator with commutators, distinguished by the fact that, in order to increase the frequency of pulse succession, the winding of the rotor of the generator consists of two mutually-perpendicular parts, one of which is short-circuited, while the other is closed across a commutator which is opened after the current pulse in the load, until the emf is restored.

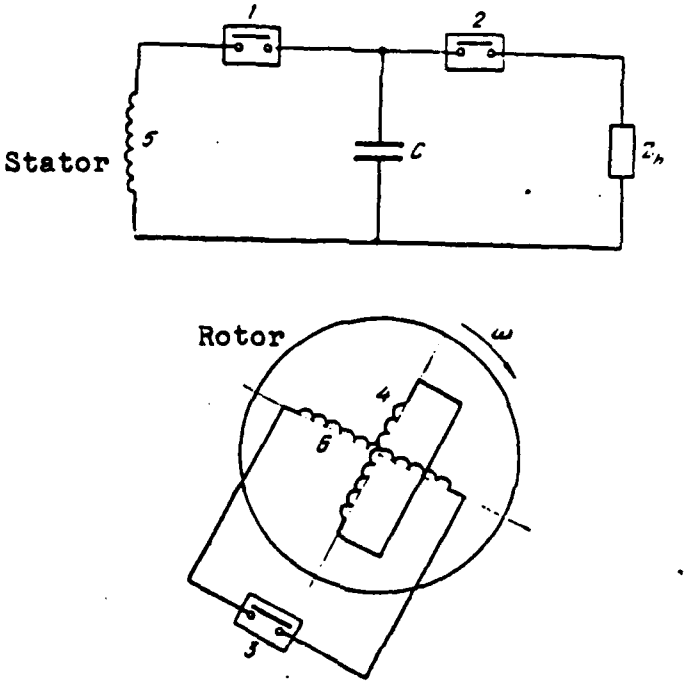


Fig. 1

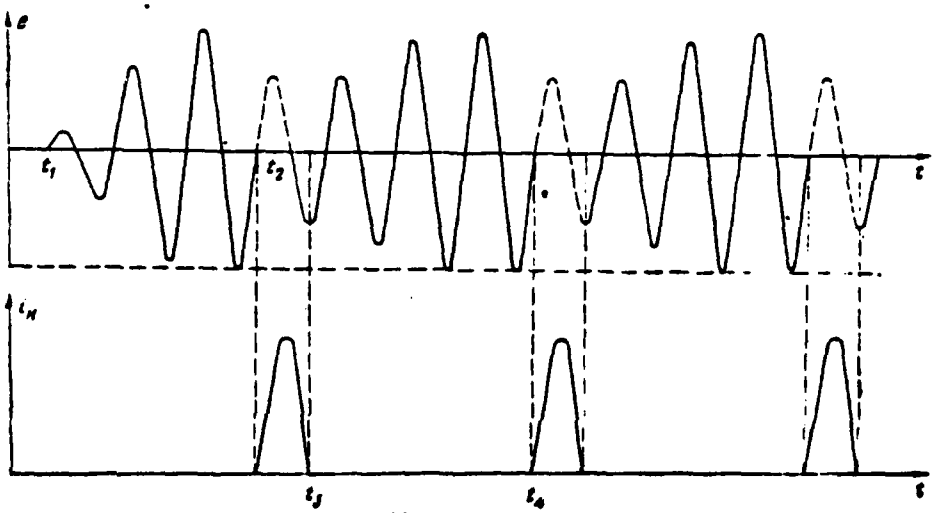
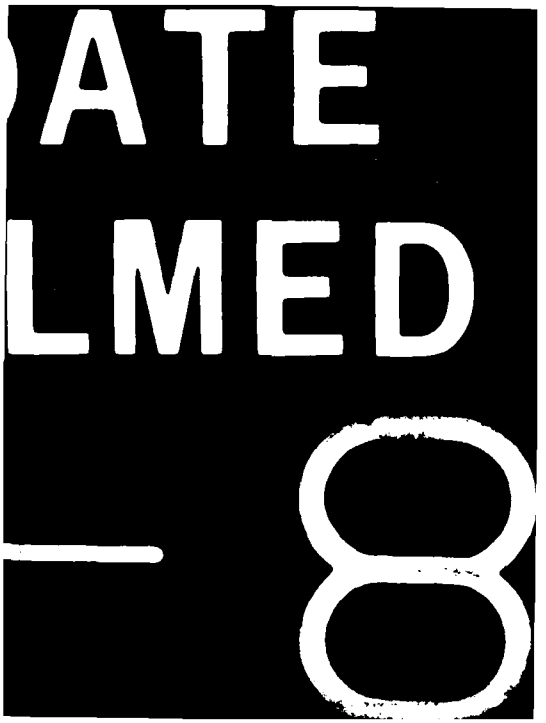


Fig. 2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